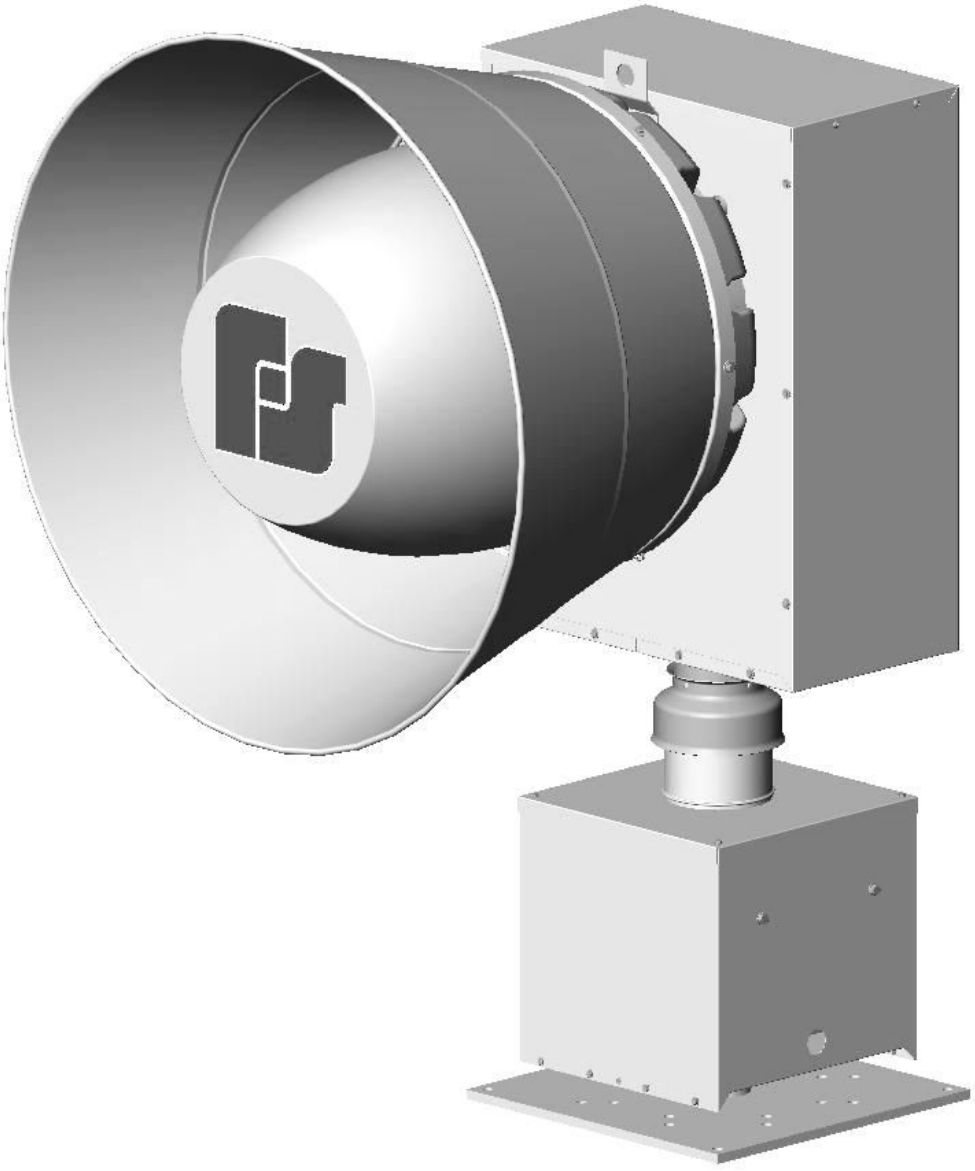
FEDERAL SIGNAL CORPORATION

EQUINOX

ELECTRO-MECHANICAL SIREN



INSTALLATION AND OPERATING INSTRUCTIONS

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IMPORTANT NOTICE

Federal Signal reserves the right to make changes to devices and specifications detailed in the manual at any time in order to improve reliability, function or design. The information in this book has been carefully checked and is believed to be accurate; however, no responsibility is assumed for any inaccuracies.

SAFETY NOTICES

People's lives depend on your selection of suitable equipment and installation sites and your safe installation, service, and operation of our products. Federal Signal recommends the following publications from the Federal Emergency Management Agency for assistance with planning an outdoor warning system: 1. The "Outdoor Warning Guide" (CPG 1-17), 2. "Civil Preparedness, Principles of Warning" (CPG 1-14), 3. FEMA-REP-1, Appendix 3 (Nuclear Plant Guideline) and 4. FEMA-REP-10 (Nuclear Plant Guideline). Contact Federal Warning System's Customer Care Center at: http://www.alertnotification.com or 1-800-524-3021 for further information about these publications.

It is important to read, understand and follow all instructions shipped with this product. In addition, listed below are some other important safety instructions and precautions you should follow.

PLANNING

- If suitable warning equipment is not selected, the installation site for the siren is not selected properly or the siren is not installed properly, it may not produce the intended optimum audible warning. Follow Federal Emergency Management Agency (FEMA) recommendations.

- If sirens are not activated in a timely manner when an emergency condition exists, they cannot provide the intended audible warning. It is imperative that knowledgeable people, who are provided with the necessary information, are available at all times to authorize the activation of the sirens.

- When sirens are used out of doors, people indoors may not be able to hear the warning signals. Separate warning devices or procedures may be needed to effectively warn people indoors.

- The sound output of sirens is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan siren placement, post warnings, and restrict access to areas near sirens.

- Activating the sirens may not result in people taking the desired actions if those to be warned are not properly trained about the meaning of siren sounds. Siren users should follow FEMA recommendations and instruct those to be warned of correct actions to be taken.

- A siren out of order will not provide any warning. After installation, service, or maintenance, test the siren system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.

- If future service and operating personnel do not have these instructions to refer to, the siren system may not provide the intended audible warning. Service personnel may be exposed to death, permanent hearing loss, or other bodily injury. File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to new recruits and trainees. Also, give a copy to anyone who is going to service or repair the siren.

SAFETY NOTICES

People's lives depend on your safe installation, service and operation of our products. It is important to read, understand and follow all instructions shipped with this product. In addition, listed below are some other important safety instructions and precautions you should follow:

INSTALLATION & SERVICE

- Electrocution or severe personal injury can occur when performing various installation and service functions such as making electrical connections, drilling holes, or lifting equipment. Therefore experienced electricians in accordance with national, state and any other electrical codes having jurisdiction should perform installation. All work should be performed under the direction of the installation or service crew safety foreman.

- The sound output of sirens is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan siren placement, post warnings and restrict access to areas near the sirens. Sirens may be operated from remote control points. Whenever possible, disconnect all siren power including batteries before working near the siren.

- After installation or service, test the siren system to confirm that it is operating properly. Test the system regularly to confirm that it will be operational in an emergency.

- If future service personnel do not have these warnings and all other instructions shipped with the equipment to refer to, the siren system may not provide the intended audible warning and service personnel may be exposed to death, permanent hearing loss, or other bodily injury. File these instructions in a safe place and refer to them periodically. Give a copy of these instructions to new recruits and trainees. Also, give a copy to anyone who is going to service or repair the sirens. For additional copies, call the Federal Warning Systems Customer Care Center at 800-524-3021 or write to them at 2645 Federal Signal Drive, University Park, IL 60484.

OPERATION

- Failure to understand the capabilities and limitations of your siren system could result in permanent hearing loss, other serious injuries or death to persons too close to the sirens when you activate them or to those you need to warn. Carefully read and thoroughly understand all safety notices in this manual and all operations-related-items in all instruction manuals shipped with equipment. Thoroughly discuss all contingency plans with those responsible for warning people in your community, company, or jurisdiction.

Limited Warranty

The Federal Warning Systems Division of ***Federal Signal Corporation*** *warrants each new product to be free from defects in material and workmanship, under normal use and service, for a period of two years on parts replacement and factory-performed labor (one year for Informer, EAS, and Federal software products) from the date of delivery to the first user-purchaser. Federal Warning Systems warrants every 2001 & Eclipse Siren (Top of pole only) to be free from defects in material, per our standard warranty, under normal use and service for a period of five years on parts replacement.*

During this warranty period, the obligation of Federal is limited to repairing or replacing, as Federal may elect, any part or parts of such product which after examination by Federal discloses to be defective in material and/or workmanship.

Federal will provide warranty for any unit which is delivered, transported prepaid, to the Federal factory or designated authorized warranty service center for examination and such examination reveals a defect in material and/or workmanship.

This warranty does not cover travel expenses, the cost of specialized equipment for gaining access to the product, or labor changes for removal and re-installation of the product. The Federal Signal Corporation warranty shall not apply to components or accessories that have a separate warranty by the original manufacturer, such as, but not limited to, batteries.

Federal will provide on-site warranty service during the first 60-days after the completion of the installation, when Federal has provided a turn-key installation including optimization and/or commissioning services.

This warranty does not extend to any unit which has been subjected to abuse, misuse, improper installation or which has been inadequately maintained, nor to units which have problems related to service or modification at any facility other than Federal factory or authorized warranty service centers. Moreover, Federal shall have no liability with respect to defects arising in Products through any cause other than ordinary use (such as, for example, accident, fire, lightning, water damage, or other remaining acts of god).

THERE ARE NO OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL FEDERAL BE LIABLE FOR ANY LOSS OF PROFITS OR ANY INDIRECT OR CONSEQUENTIAL DAMAGES ARISING OUT OF ANY SUCH DEFECT IN MATERIAL WORKMANSHIP.

2645 Federal Signal Drive, University Park, IL 60484
Phone: (800) 524-3021 Fax: (708) 534-4865
Website: http://www.alertnotification.com

WARNING

Read and understand the information contained
in this manual before attempting to install or
service the siren.

Pay careful attention to the following notices located on the equipment.

NOTICES – EXTERNALLY PLACED.

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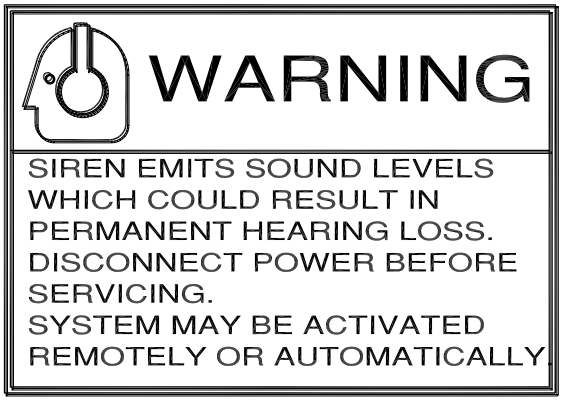

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SECTION I
CHARACTERISTICS

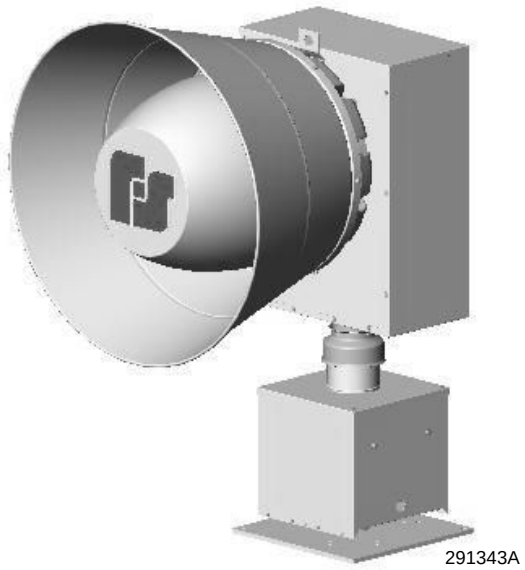

Figure 1-1. Model Equinox

1-1. SCOPE OF THIS MANUAL.

This service manual describes the characteristics, specifications, installation, controls/theory of operation, and service and maintenance of the Federal Equinox siren.

1-2. GENERAL.

Federal's Equinox siren (*Figure 1-1*) is an electro-mechanical, DC, rotating siren that is capable of producing high intensity warning signals over a large area. A highly efficient design enables the siren to produce a high sound level, while making moderate demands on the power source.

1-3. SIREN DESCRIPTION.

The Equinox siren is a single tone siren capable of producing a 125 dB sound level at 100 feet for a minimum of 15 minutes, when using the DCB series Control Unit/Battery Box with fully charged, standard, deep-cycle, marine batteries. 30-minute duty cycle operation is available with option 2001TRB. This option supplies DC current directly to the siren from a 208/220 or 240, optionally 480 VAC line.

Two motors are used to create the siren signals. One motor rotates the siren assembly. The second motor, which produces the sound energy, is attached to a stator with a rotor mounted on the motor shaft concentric to the stator. The rotor and stator each contain one row of ports. As the motor rotates the rotor, air is drawn into the rotor and passes through the rotor and stator ports in pulses. These pulses are produced when the rotor alternately opens and closes the stator ports. The pulses of air produce sound at a frequency (pitch) that is dependent upon the rotational speed of the motor and the number of ports in the rotor-stator combination.

1-4. SIGNAL DESCRIPTION.

The Equinox siren is capable of producing a steady signal and a wailing signal. The steady signal is frequently used as a Civil Defense "Alert" signal. The wailing signal is often used as a Civil Defense "Attack" signal. Any of the signals are capable of being used for any desired application. These signals are shown graphically in *Figure 1-2*.

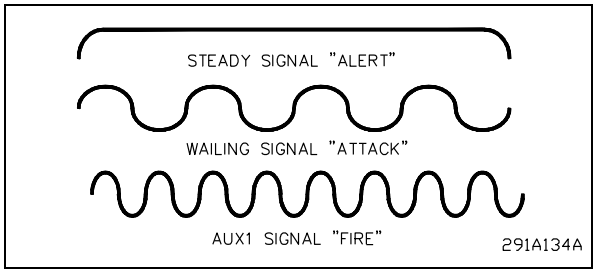

Figure 1-2. Signal Characteristics.

SECTION II
SPECIFICATIONS

Power Requirements*

Siren Motor	48V (DC or full wave rectified AC) 115 Amps (nom.)
Rotator Motor	48V (DC or full wave rectified AC) 1 Amp (nom.)

Wiring

Siren Motor	2 AWG
Rotator Motor	14 AWG

Motor Type

Siren	Series Wound DC 6.5 Hp
Rotator	Permanent Magnet DC 1/8 Hp

Signal Information

Signal	Frequency Range	Sweep Rate
STEADY	500 Hz	N.A.
WAIL	180 - 500Hz	10 sec.
FAST WAIL	300 - 500Hz	3.6 sec.

Signal Duration	3 min. (programmable)
Sound Output (SPL)	125 dBC +/-1 dBC (on axis) at 100' (30.5m.)
Rotation	3 RPM
Dimensions (HWD)	62" x 37" x 41" 1574 mm x 940 mm x 1041 mm
Shipping Weight	460 pounds (209 kg.)
Siren Weight	350 pounds (159 kg.)
Operating Temperature	-30 °C to +60 °C **

* Power requirements refer to the power supplied by the batteries or optional AC operation with battery back up.

** The siren can operate throughout this temperature range provided the battery temperature is maintained at -18 °C or higher.

SECTION III
INSTALLATION

DANGER

Electrocution or severe personal injury can occur when making electrical connections, drilling holes, or lifting equipment. Therefore, installation should be performed by experienced electricians in accordance with national and local electrical codes.

3-1. SIREN LOCATION.

The information in this section provides guidelines to aid the user in the selection of an installation site that makes the best possible use of the siren.

WARNING

The output level of an Equinox siren is capable of causing permanent hearing damage. To prevent excessive exposure, carefully plan the siren location and post warnings where excessive levels may be encountered. Refer to OSHA 29 CFR 1910.95 for safe exposure limits.

Careful consideration of the factors affecting the propagation of sound from the siren and the response of the human ear to the sound will optimize the ability of the siren to effectively warn the community. Follow Federal Emergency Management Agency (FEMA) guidelines when designing the warning system.

The reduction of signal intensity as the distance from the siren increases and the minimum desired signal level at the fringe of the area to be covered are important considerations when choosing a siren installation site. As the distance from the siren increases, sound level losses accumulate. These losses are a result of weather conditions, terrain, obstructions in the sound path and vary with frequency.

Optimum sound propagation conditions exist when there are no obstructions in the sound path, the terrain is flat, and the air is calm and warm compared to the ground temperature. Since these conditions are rarely met, under typical outdoor conditions, each time the distance from the siren is doubled, the sound level decreases by approximately 10 dB making it half as loud. For example, if the sound level at 100 feet (30.5 m) from an Equinox siren is 125 dB, at 200 feet (61 m), the level drops to 115 dB; at 400 feet (122 m) the sound level drops to 105 dB, etc. This is referred to as the “loss per distance doubled”.

Experience has shown that a loss per distance doubled of 10 dB is a generally conservative loss factor that is applied to outdoor sound propagation over long distances under average conditions. Large obstructions, wind, temperature gradients, and terrain can significantly increase sound loss to 12 or more dB per distance doubled. An acoustic survey of the area using acoustic modeling software is recommended to optimize sound coverage.

Studies indicate that an individual with normal hearing will probably hear a warning signal whose intensity is at least as high as the ambient noise level. FEMA guidelines recommend 10 dB SPL above ambient for warning system design to provide adequate warning.

FEMA lists ambient noise levels typically encountered as follows:
Urban Residential areas = 60 dBC
Industrial Area = 70 dBC
Within 100’ of Busy Highways = 90 dBC

Assuming a typical 10 dB loss per distance doubled and a 70 dB minimum sound level

required to warn a typical urban area, the effective range of the Equinox siren is approximately 3200 feet.

Wind speed and direction affect the propagation of sound from the siren. Consequently, the direction of the prevailing wind may also be a factor to consider when selecting the installation site(s) of a small, one or two-siren system. For example, if the prevailing wind is from the west, it may be desirable to install the siren toward the western edge of the area to be covered.

Other factors to consider before selecting the installation site include the availability of electrical power, the ease of installation and maintenance, the height of surrounding obstructions, and security against vandalism.

3-2. SIREN INSTALLATION.

A. General.

Most siren installations are one of two types: Pole Mount or Flat Surface Mount. These two configurations make it possible to install a siren in almost any situation. If the installations in this paragraph are not suitable, modification of one of the configurations may be practical.

A siren is typically installed 40 - 50 ft. above the ground. If the installation is located less than 40 ft. above the ground, the sound intensity at close range may increase, but at the same time the effective range of the siren may be reduced. Conversely, if the siren is located more than 50 ft. above ground, the effective range of the siren may increase, but the sound may skip over areas closer to the siren. These variables may make it desirable to test the sound coverage of the siren at various heights and locations whenever possible.

B. Pole Mounting.

A typical siren pole-mounted installation is shown in *Figure 3-1*. The siren is mounted on a Southern Yellow Pine, Douglas Fir or equivalent Class 2 utility pole 40 - 50 ft. above the ground. It is attached to the pole by means of legs, as shown in *Figure 3-2*.

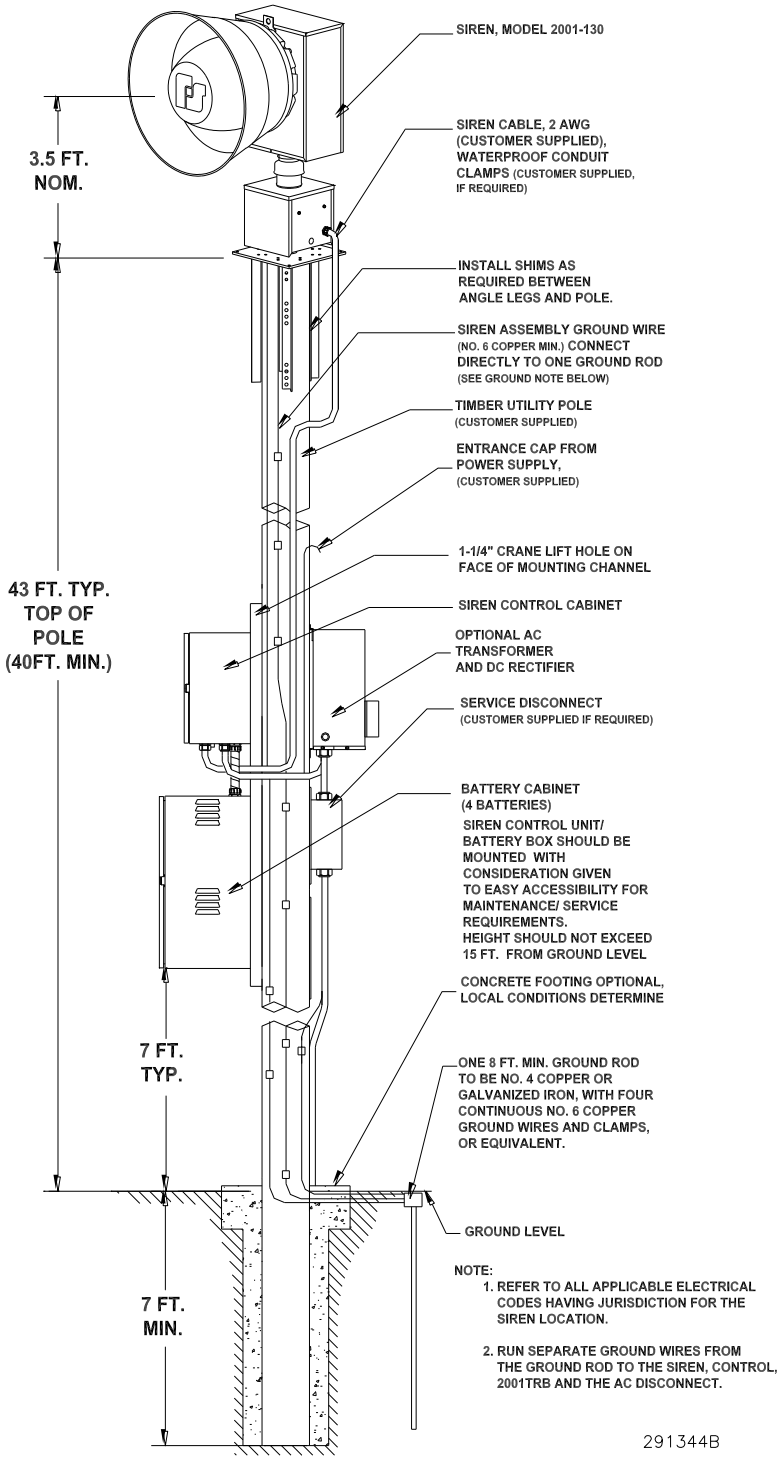
SIREN, MODEL 2001-130
SIREN CABLE, 2 AWG (CUSTOMER SUPPLIED), WATERPROOF CONDUIT CLAMPS (CUSTOMER SUPPLIED, IF REQUIRED)
3.5 FT. NOM.
INSTALL SHIMS AS REQUIRED BETWEEN ANGLE LEGS AND POLE.
SIREN ASSEMBLY GROUND WIRE (NO. 6 COPPER MIN.) CONNECT DIRECTLY TO ONE GROUND ROD (SEE GROUND NOTE BELOW)
TIMBER UTILITY POLE (CUSTOMER SUPPLIED)
ENTRANCE CAP FROM POWER SUPPLY, (CUSTOMER SUPPLIED)
1-1/4" CRANE LIFT HOLE ON FACE OF MOUNTING CHANNEL
43 FT. TYP. TOP OF POLE (40FT. MIN.)
SIREN CONTROL CABINET
OPTIONAL AC TRANSFORMER AND DC RECTIFIER
SERVICE DISCONNECT (CUSTOMER SUPPLIED IF REQUIRED)
BATTERY CABINET (4 BATTERIES)
SIREN CONTROL UNIT/ BATTERY BOX SHOULD BE MOUNTED WITH CONSIDERATION GIVEN TO EASY ACCESSIBILITY FOR MAINTENANCE/ SERVICE REQUIREMENTS. HEIGHT SHOULD NOT EXCEED 15 FT. FROM GROUND LEVEL
CONCRETE FOOTING OPTIONAL, LOCAL CONDITIONS DETERMINE
7 FT. TYP.
ONE 8 FT. MIN. GROUND ROD TO BE NO. 4 COPPER OR GALVANIZED IRON, WITH FOUR CONTINUOUS NO. 6 COPPER GROUND WIRES AND CLAMPS, OR EQUIVALENT.
GROUND LEVEL
7 FT. MIN.
NOTE:
1. REFER TO ALL APPLICABLE ELECTRICAL CODES HAVING JURISDICTION FOR THE SIREN LOCATION.
2. RUN SEPARATE GROUND WIRES FROM THE GROUND ROD TO THE SIREN, CONTROL, 2001TRB AND THE AC DISCONNECT.
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Figure 3-1. Typical Pole-mounted Installation

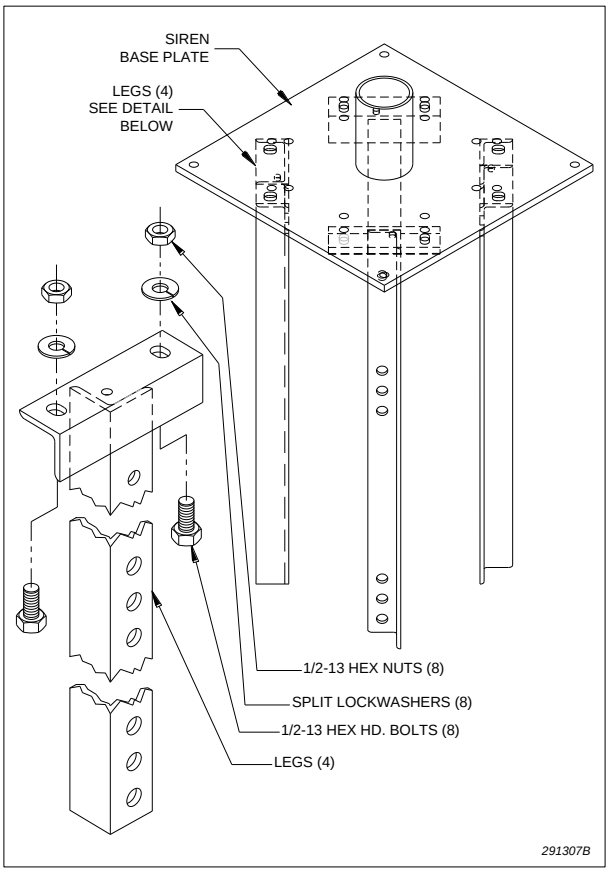

Figure 3-2. Siren Leg Assembly.

Using the 3 ft. long angle iron legs, the siren is mounted on the Class 2 utility pole as follows:

1. Uncrate the siren and remove the nuts that hold the siren on the shipping base. Lift the siren approximately 3-1/2 ft. with a crane or hoist.

2. Install the four legs on the siren mounting plate, as shown in *Figure 3-2*. Use two 1/2" bolts, nuts and lockwashers (provided) for each leg. Do not tighten the bolts completely.

WARNING

The lifting bracket does NOT have sufficient strength to support the combined weight of the siren and a utility pole. Therefore, do NOT attempt to erect the pole and siren together using the bracket as a lifting point.

3. Erect the utility pole in accordance with accepted practices. Be sure the pole extends at least 40 ft. above the ground (refer to WARNING above).

4. Raise the siren to the necessary height, and lower it over the pole.

5. Adjust the legs and insert shims, if necessary, between the siren legs and pole. The legs adjust to a diameter between 7.53" and 12.25" (See *Figure 3-3*). Bolt the siren to the pole using two 5/8" galvanized lag bolts with washers and split lockwashers per leg. At least four inches of lag bolt must be screwed into the pole. Tighten all bolts.

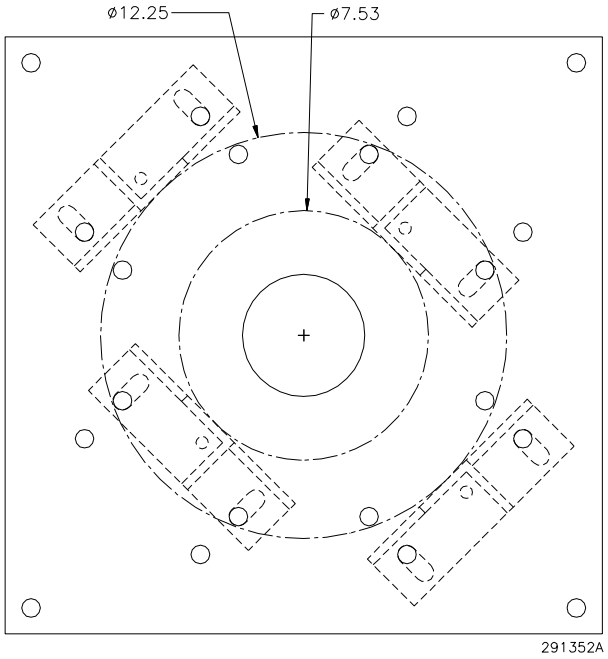

Figure 3-3. Leg Assembly Diameters.

C. Flat Surface Mount.

This installation configuration is practical when the installation site is on a flat roofed building. The siren can be anchored directly to the roof, on a platform as shown in *Figure 3-4*, or on a weight distribution mat like the one shown in *Figure 3-5*.

This mat is required when the siren mounting surface is unable to support over 176 pounds per square foot (859 kg per square meter). The mat shown in *Figure 3-4*

distributes the siren weight to approximately 25 pounds per square foot (122 kg per square meter). When installing the siren on a flat roof, be sure that it clears the parapets or other obstructions by at least ten feet.

To install an Equinox on a flat roof or other flat surface, proceed as follows:

1. If desired, construct a platform for mounting the siren, which must be capable of supporting at least 435 lbs. (197 kg.) as well as withstanding a siren wind load of 100 mph. The platform must also be capable of distributing its own weight plus the siren to a value that is safe for the mounting surface. Platform design and construction details should be designed by a structural engineer familiar with the building construction of the intended install location. Locate the platform at the siren installation site. The platform must be properly anchored to the mounting surface.

WARNING

The hoisting bracket does not have sufficient strength to support the combined weight of the siren and a platform. Therefore, do NOT lift the siren and platform together using the bracket as a lifting point.

2. Hoist the siren to the installation site using the lift bracket as a lifting point (refer to WARNING above).

3. Anchor the siren to the mounting surface with 1/2" lag bolts or nuts and bolts, as appropriate through the mounting holes (one in each corner) in the siren base plate (see *Figure 3-4*, detail A). If the siren is mounted directly on a roof, (without a platform or weight distribution mat) be sure to install waterproof joints at the points where the mounting bolts pass through the roof so that water does not enter the building.

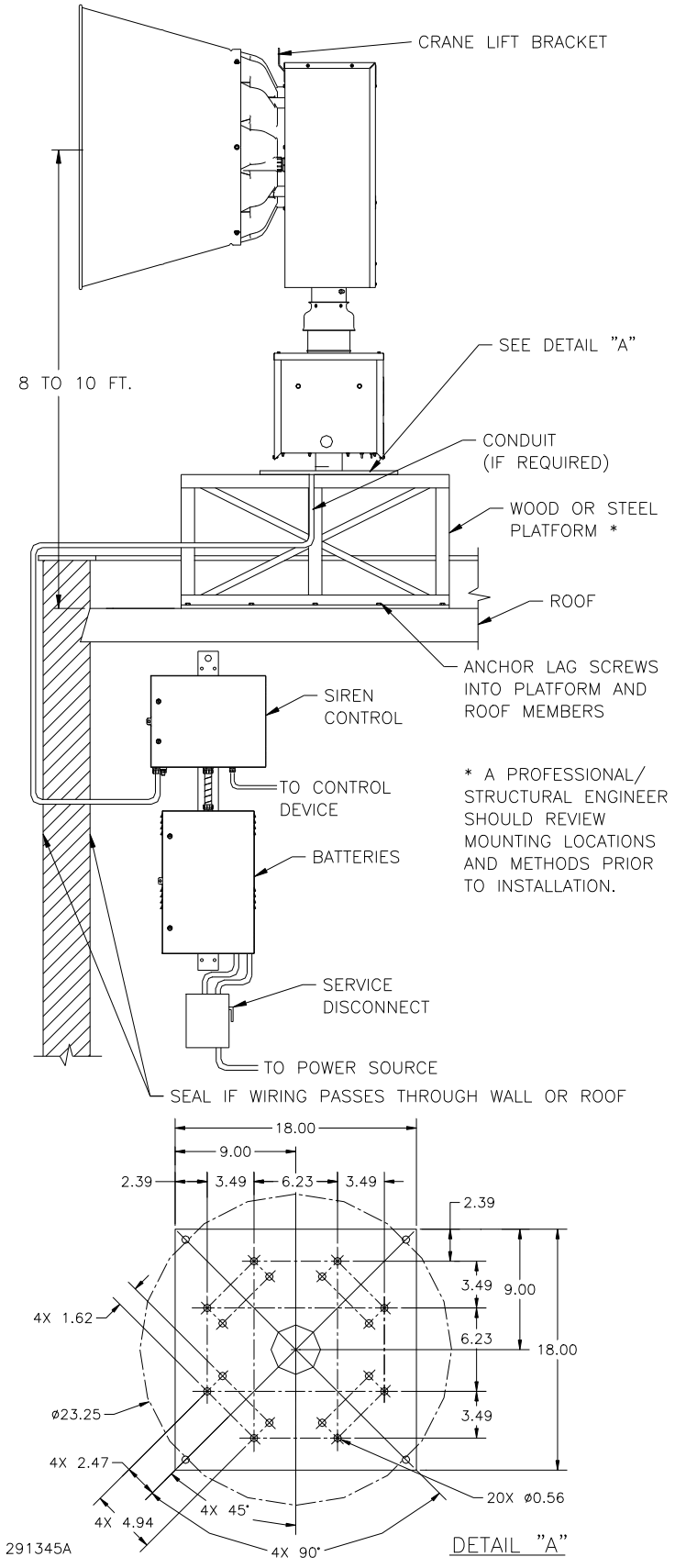

Figure 3-4. Typical Surface-mounted Siren Installation

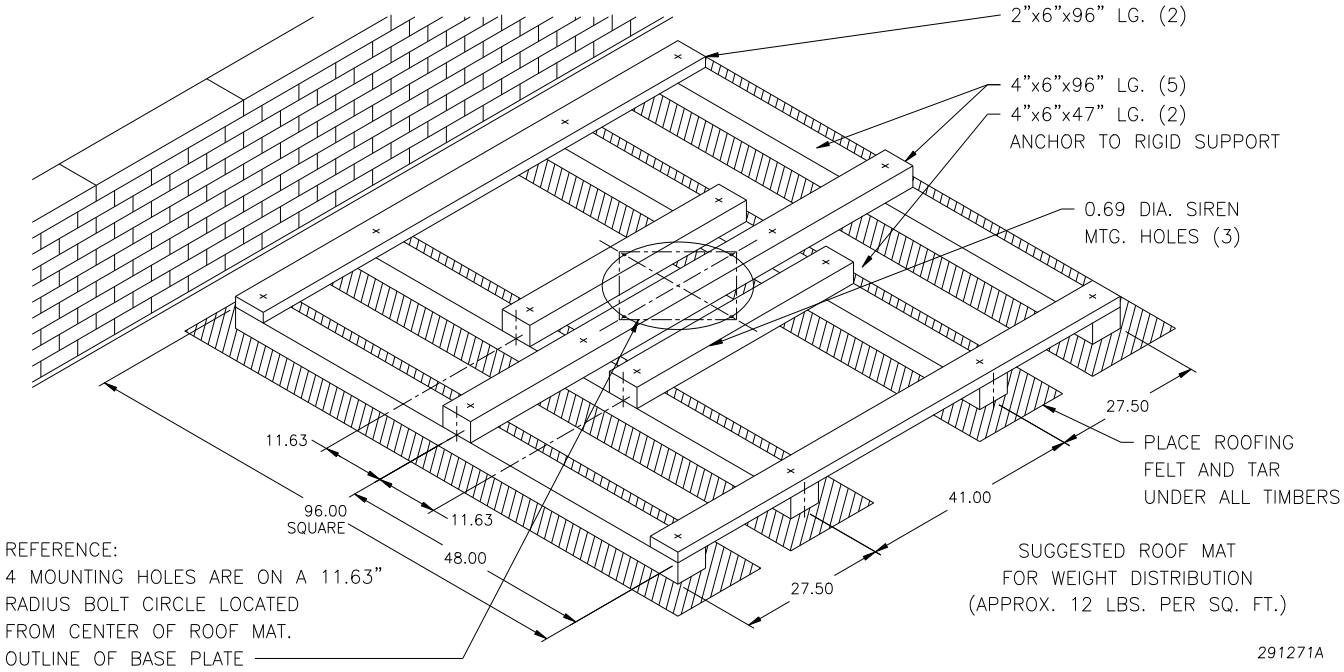

Figure 3-5. Weight Distribution Mat Construction

3-3. SIREN WIRING.

The Equinox is pre-drilled on two sides for connecting a 1" conduit to either side. The siren enclosure is rain tight. To maximize the longevity of the siren, rigid watertight conduit connections are recommended between the Equinox and the controller.

Three wires are required to operate the Equinox. One #2 AWG red wire from the 48 VDC chopper control contactor output of the controller provides positive power to the chopper motor. One #12 AWG red wire from the rotator control contactor output of the controller provides positive power to the rotator motor. One #2 AWG black wire provides a common 48 VDC negative ground between the ground plane of the control cabinet and siren motors. See *Figure 3-6* for the wire connections in the Equinox. Consult the manual for the controller being utilized to connect the wires from the head.

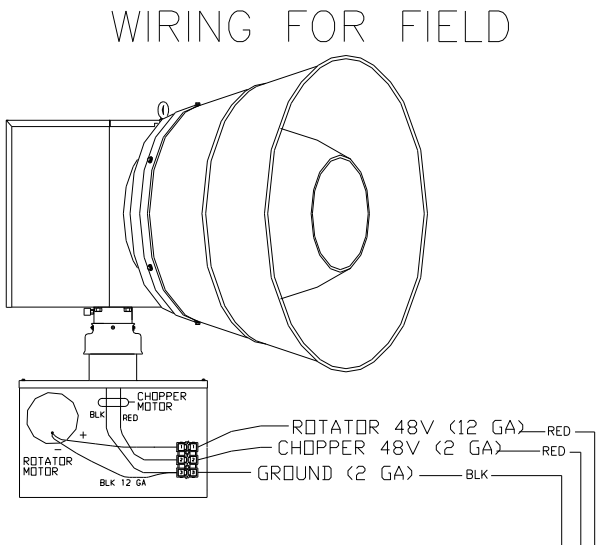

Figure 3-6. Wiring for Rotator Motor

All wire connections should be treated with anti-oxidant to prevent corrosion from moisture and natural processes. Care should be taken to insure that all wire connections are firmly tightened. To properly tighten the wire connections in the terminal block, insert the wire, firmly tighten the setscrew, move the wires to loosen and repeat the process until the wires are securely tightened.

3-4. PRE-OPERATION CHECKOUT.

After the siren has been completely installed, perform the following checks before putting the siren into service.

WARNING

The output sound level of a siren is capable of causing severe hearing discomfort or permanent hearing damage. Therefore, ALWAYS wear hearing protection when performing tests or maintenance on the siren.

A. Make sure that all air intakes and sound outlets are not obstructed.

B. Make sure all connections in the Control Unit/Battery Box are correct and properly tightened.

C. Activate all siren tones to verify they are operating properly. The siren should remain rotating during all alert tones.

D. After the installation is complete and it has been established that the siren is operating properly, Federal recommends that all control devices be padlocked to discourage tampering and vandalism.

SECTION IV
SERVICE

4-1. GENERAL.

DANGER

Service should be performed by qualified personnel familiar with the siren, associated controls, and power sources being used. The siren has moving parts, high operating currents, explosive gases, and corrosive materials that could cause severe personal injury, electrocution, or death. Before servicing or maintaining, ensure that remote activation cannot occur and disconnect power to the siren and its controls.

Experience has shown that all Federal sirens are highly reliable devices. However, if a siren failure does occur, Federal will provide technical assistance with problems that cannot be handled satisfactorily and promptly locally. If assistance is desired, contact:

FWS Customer Care Center
Signal Division
Federal Signal Corporation
2645 Federal Signal Drive
University Park, Illinois 60484
800-524-3021

WARNING

The output sound level of an Equinox siren is capable of causing permanent hearing damage. Therefore, ALWAYS wear hearing protection when performing tests or maintenance on the siren.

To prevent the siren from sounding or rotating, always turn off the power to the siren at the disconnect switch and remove the 48 VDC, 4 AWG red wire in the Battery Box before inspecting or maintaining the siren.

4-2. INSPECTION.

Test the Equinox siren for proper operation at least once a month. A daily test at noon, curfew, or other selected time is preferred. This not only enhances the usefulness of the siren, but also instills public confidence in the reliability of the warning system.

In order to minimize the possibility of siren failure, annual inspection and maintenance is desirable. Battery replacement should be performed approximately every five years. This schedule is only a suggested guideline. It may be necessary to vary the schedule if the siren is used frequently or if it is used in an extreme climate.

A. Turn off the power to the siren at the disconnect switch. Disconnect the 48 VDC, 4 AWG red wire in the Control Unit.

B. Inspect the siren installation to be sure that it is vertically oriented. Take corrective action if a pole-mounted installation is more than 5º from vertical or if a roof or flat surface mount is more than 10º from vertical. This will prevent lubrication losses and excessive motor bearing wear.

C. Inspect all electrical and mechanical connections. Make sure that all fasteners are properly tightened.

D. Inspect all painted surfaces and repaint as necessary.

E. Both the rotator motor and siren motor have sealed and pre-lubricated bearings. Therefore, neither of these motors requires any additional lubrication.

4-3. CORRECTIVE MAINTENANCE.

This section includes illustrations that may be helpful if the siren or rotator needs repair.

WARNING

To prevent siren from sounding or rotating, always turn off power at the disconnect switch and disconnect the 48VDC, 4 AWG red wire in the Control Unit before performing any maintenance on the siren.

A. Drive Band Adjustment.

1. When the drive band requires adjustment, tightening is almost always necessary. To determine if a drive band adjustment is required:

(a). Turn off power to the siren at the disconnect switch. Remove the 48 VDC, 4 AWG red wire in the Control Unit.

(b). Attach a spring scale having a capacity of at least 50 pounds (22 kg.) to the horn of the siren as shown in *Figure 4-1*.

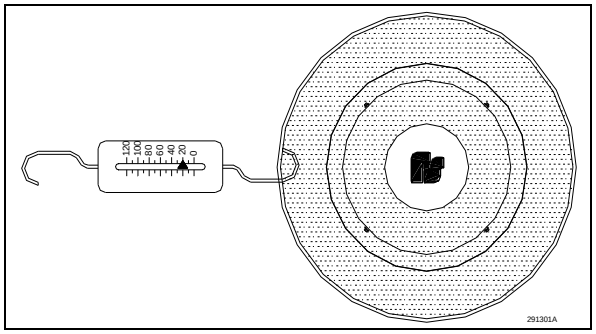

Figure 4-1. Spring Scale Attachment to Siren.

(c). Pull on the scale until the horn begins to rotate. Continue to rotate the horn by pulling on the scale while reading the scale. The scale should indicate between 25 to 30 pounds (11 and 13 kg.). It may require more than 40 pounds of force to start the horn moving. However, after the horn is moving, the scale indication should decrease to some force within the specified range. If the scale does not indicate between 25 and 30 pounds (11 and 13 kg.), the drive band requires adjustment.

2. To adjust the drive band:

(a). Perform steps (a)., (b)., and (c). in paragraph 4-3., A.1. (left) to determine if a drive band adjustment is necessary.

(b). Ensure that power to the siren is disconnected.

(c). Remove the panel opposite the conduit fitting on the rotator housing.

(d). Tighten the cross bolt with the spring one or two turns (see *Figure 4-2*). DO NOT tighten or loosen the cross bolt without the spring. Attach the scale to the horn and pull on the scale to rotate the horn. If the scale does not indicate between 25 and 30 pounds (11 and 13 kg.), repeat this step until the scale indicates the proper force.

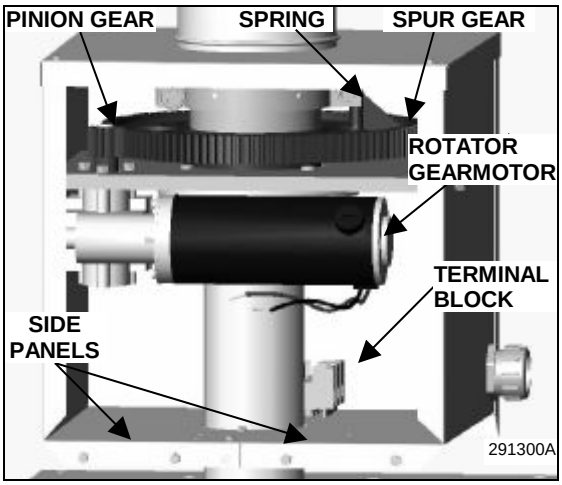

Figure 4-2. Rotator Assembly Interior

CAUTION

If the cross bolt with the spring is tightened so that more than 40 pounds (18kg.) of pull is necessary to maintain manual horn rotation, high winds may cause damage to the rotator drive mechanism.

(e). Replace the panel on the rotator housing.

B. Collector Ring Brush Replacement.

1. Remove the cover from the top of the collector housing.

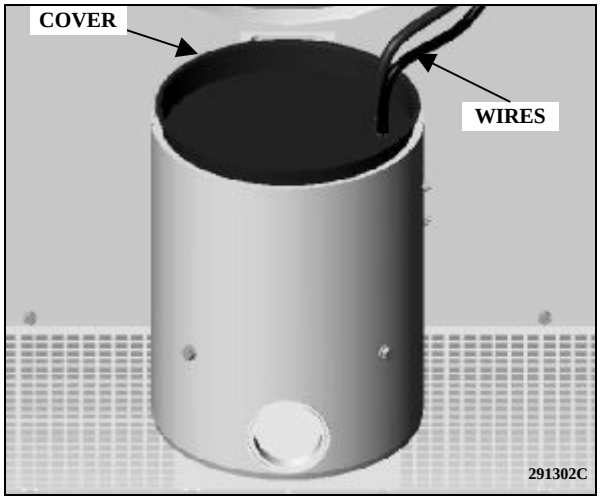

Figure 4-3. Collector Ring Housing

2. Note the wiring location before removing the wires. (See *Figure 4-3*).

3. Remove the four bolts on the side of the collector housing assembly (see *Figure 4-4*) and remove the brush assembly. Note: Press down on brush assembly while removing the four bolts. Brush assembly is under spring tension while in position.

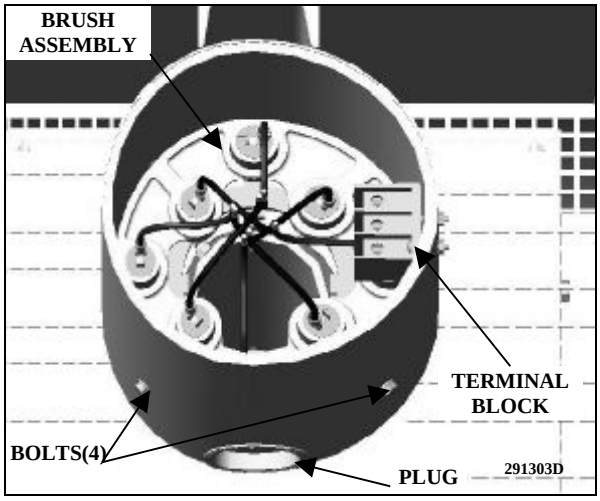

Figure 4-4. Installation/Removal Brush Assy.

4. Remove lead wire from brush holder. Remove the worn brush from the brush holder in the brush holder plate. (See *Figure 4-5*).

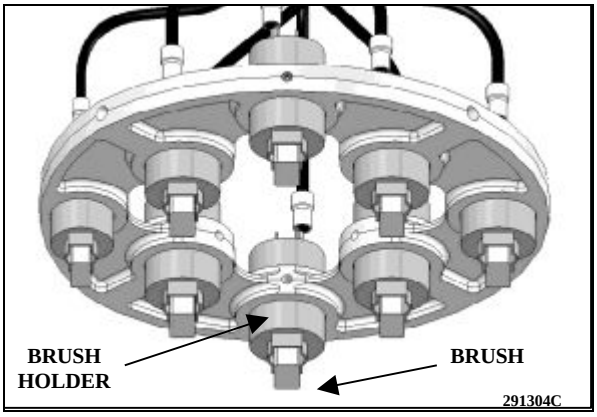

Figure 4-5. Brush Holder Assy.

5. Insert the replacement brush into the brush holder. Connect the lead wires to the brush holder.

C. Collector Ring Removal.

1. Remove the brush assembly as described above.

2. Disconnect the three wires from the terminal block (TB5) inside the rotator housing and begin feeding wires up into the siren shaft (see *Figure 4-2*).

3. Federal suggests that the rotator drive band be loosened, as described in paragraph 4-4.B., to rotate the siren during removal of the collector ringbolts.

CAUTION

To prevent damage to the cover assembly, use a piece of wire to secure the cover in an open position before removing the housing's back panel.

4. Remove the back panel to expose the small plug on the collector housing assembly.

5. Remove the small plug.

6. Manually rotate the siren and remove each of the four bolts that hold in the collector rings (see *Figure 4-7*). Access to

these bolts can be gained through the plug opening.

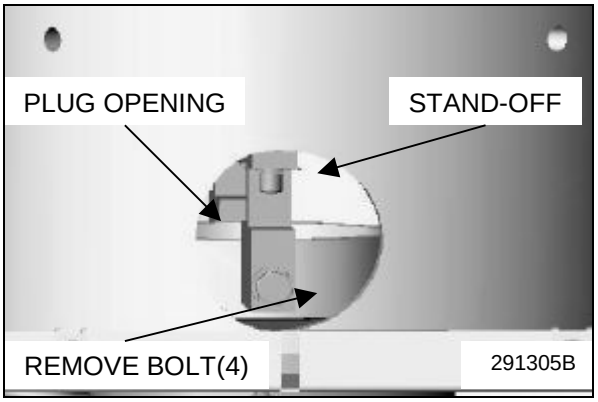

Figure 4-7. Collector Housing Opening

7. Remove the collector rings with stand-offs and cables still attached (see *Figure 4-8*).

8. Reassemble the collector rings, stand-offs, and cables before reinstallation.

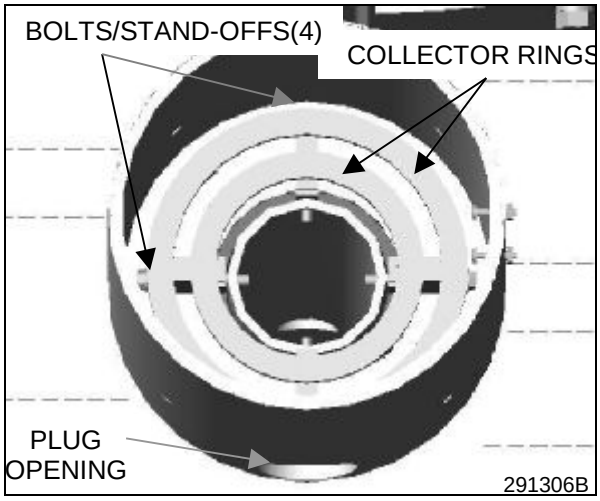

Figure 4-8. Collector Rings

9. To replace collector ring assembly, align the stand-offs before replacing the four bolts removed in step seven above.

10. Ensure that collector rings are concentrically aligned before replacing the brush assembly.

11. Replace the brush assembly.

12. Look through the plug opening and ensure that brushes are contacting the proper collector rings.

13. Replace the plug on the collector housing assembly.

14. Replace the back panel.

D. Rotator Motor Replacement.

1. Remove the two rotator housing panels (see *Figure 4-2*).

2. Replace the rotator motor. Approximately a 1/64" gap between the teeth of the two gears is required to avoid binding. Re-tighten rotator motor bolts to a torque of 45 in. lbs.

3. Wire rotator motor and terminal block as shown in *Figure 3-6*.

4. Grease all gear surfaces with Mobil Mobilith SHC lithium based grease.

5. Replace housing panels.

E. Siren Motor Brush Replacement.

1. Remove the outer cone. Remove the inner cone by removing the four 1/4-20 bolts which secure the cone to the four internal mounting brackets (8402087E-01).

2. Note siren motor wiring and remove both terminal connectors.

3. Remove steel mesh brush covers from motor.

4. Replace worn brushes.

5. Replace steel mesh brush covers.

6. Replace terminal connectors, lockwashers, and nuts. Tighten nuts.

7. Replace inner and outer cones.

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	8402036D	PROJ., INNER CONE
2	1	8402026B	PROJ. OUTER,SIREN
4	1	8402190	STATOR, 8 PORT, 16"
5	1	8602101B-P	ROTOR,8 PORT,16" (A3)
6	25	70744016	LOCKWASHER,SPLIT,1/4,SS
7	1	8402A068A	FITTING,1" CONDUIT,CARLON
8	0.75 ft	R92-11-01	CONDUIT,CARFLON
9	2	8402173A	COVER,HOUSING,SIDE
10	1	8402172A	COVER,HOUSING
11	9	7000A311-14	SCR,HEX HD,SS,1/4-20 X 7/8
12	1	229A283A	TERMINAL,POWER DIST.
13	15	7000A311-10	SCR,HEX HD,SS,1/4-20 X 5/8
15	2	8402155A	COVER,ROTATOR FRONT
16	4	7002A005-06	SCR,CAP,HEX HD,SS 5/16-18X3/8
17	4	70744020	LOCKWASHER,SPLIT,SS,FOR 5/16 SCREWS
18	1	8402B056A	CHOPPER TUBE ASSEMBLY
19	8	7002A013-20	SCR,CAP,HX HD,STL,1/2-13X1 1/4
20	1	8400017L	BEARING,SLEEVE
21	8	70744059	LOCKWASHER,SPLIT,FOR 1/2 SCREW
22	2	8402156A	COVER,ROTATOR END & BOTTOM
23	26	7000A346-08	SCR,MACH,HX HD,WSL,IND,10-32X1/2
24	1	8400C088	GEAR,SPUR,108 TECTH,11" PITCH DIA
26	1	8402157A	PLATE,BASE,ROTATOR
28	2	7058A008	NUT,EL STOP,HEX,LT STL,10-32
29	2	7000A070-16	SCR,MACH,RD HD,PHIL,SS,10-32X1
30	1	229296A-01	TERM. BLOCK,NO SCREWS
31	2	7058A013	NUT,EL STOP,HEX,LT SS,3/8-16
32	1	7000A326-32	SCR,MACH,HEX HD,SS,3/8-16X2
33	2	7072A034	WASHER,FLAT,STEEL,FOR 3/8 SCREW
34	1	7002A007-56	SCR,CAP,HX HD,STL,3/8-16 X 3-1/2
35	1	82B3A886	SPRING
36	2	84008055	DRIVE BAND ASSEMBLY
37	2	231200A	PLUG,KNOCKOUT
38	14	7072A024	WASHER, FLAT, 1/4 SCREW
39	4	7000A311-36	SCR,HEX HD,SS,1/4-20 X 2 1/4
40	1	8402153A	COVER ASSY,ROTATOR TOP
41	1	8400B041	COVER,ROTATOR SEAL
42	14	701167A-08	SCREW,THD. FRM,HB A,1/2" LG.
43	30	7075A072	WASHER,#10 INTERNAL TOOTH
44	14	7068A000	NUT,SPB,U TYPE,RELIEF NOTCH,8A
45	10	7058A047	NUT,MACH SCR,KEPS,10-32
47	4	7072A059	WASHER,FLAT,STEEL,.594X1.156
48	1	81462009A	NAMEPLATE,FS LOGO,LARGE
49	1	161A507A	LABEL,WARNING, HEARING LOSS
50	1	161A506A	LABEL,WARNING, AMPUTATION
51	1	H447-111	NAMEPLATE,2001-130
52	2	7099A103-15	RIVET,POP,OPEN END, 1/8" HEAD DIA
53	2	7058A045	NUT, KEPS, SS, 8-32
54	2	7075A007	LOCKWASHER,EXT TOOTH,FOR 1/4 SCREW
55	3	7058A010	NUT, ELASTIC STOP, HEX, LIGHT, 1/4-20
56	2	7000A499-14	SCR,MACH,PAN HD,PHIL HD,STEEL,8-32 X 7/8
57	4	7002A009-16	BOLT,HEX HD,SS,3/8-16 X 1
58	5	70744046	LKWSHR, SPLT, SS, 3/8
59	1	7002A007-44	SCR,CAP,HX HD,STL,3/8-16 X 2-3/4
60	1	8402181A	KEY,3/16 X 3/16 X 2-1/2
61	1	8402006E	MOTOR,48 VDC,100A
62	16	7065055A	RIVNUT,10-32,ALUMINUM
63	1	161359B	LABEL,MOTOR,CAUTION
64	1	84021388	SCREEN,STATOR
65	1	8402144A	GEARMOTOR,ROTATOR
66	1	81462318A	NAMEPLATE,FEDERAL SIGNAL EQUINOX
67	6	7088040A-12	SET SCREW,5/16-24,S.S.
68	1	231253A	PLUG,PULL RING,2"NPT,PLASTIC
69	4	7099214A	RIVET,BLIND,5/32
70	2	7072267A	WASH,FLAT,3/8 HEAVY
71	1	230694-01	PLUG,0.00" PLASTIC,TAPERED,W/HOLES
72	1	84020240	BRUSH HOLDER ASSY.
73	2	8402194A-01	PLATE,STATOR,INNER CONE
74	2	7002A009-08	BOLT,HEX HD,SS,3/8-16 X .5
75	1.1 oz	R70-16-01	RTV,BLUE SILICONE GASKET
76	2 oz	R70-20-01	CAULK,ACRYLIC LATEX,W/SILICONE
REF	0	82261142A	DIMENSIONAL OUTLINE,2001-130
REF	0	8402122A	COLLECTOR RING ASSY
REF	0	85905172A	TEST PROCEDURE,EQUINOX SIREN
88	1	8602121B	SPACER,ROTOR,ECLIPSE
89	1	8402193B-P	HOUSING,WELDMENT
90	10	70720115	WASHER FLAT #10
91	1	8602101B-P	ROTOR,8 PORT,16"

x REQUIRED IN CRATING

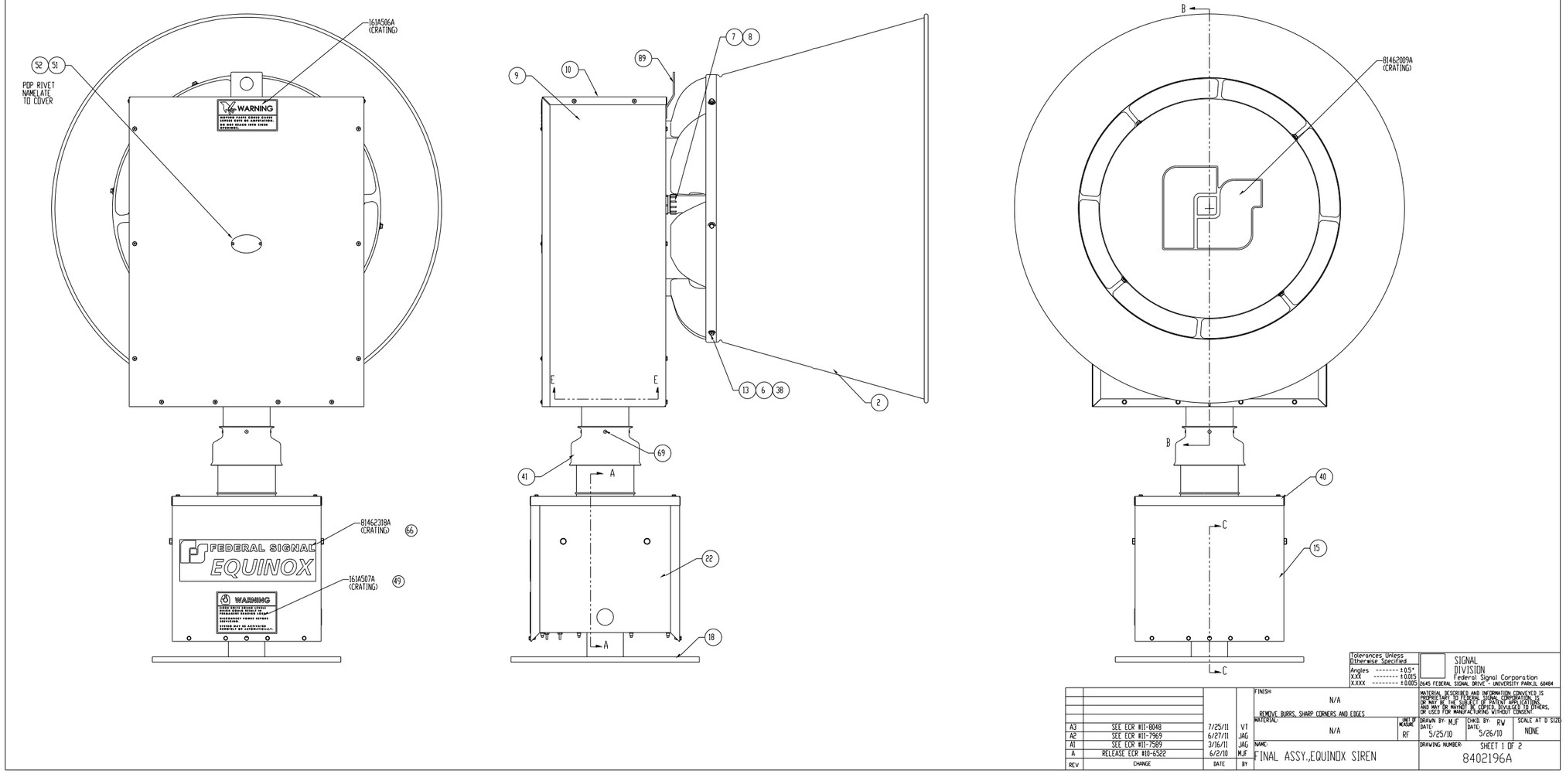

Figure 4-9. Equinox Final Assembly, Sheet 1

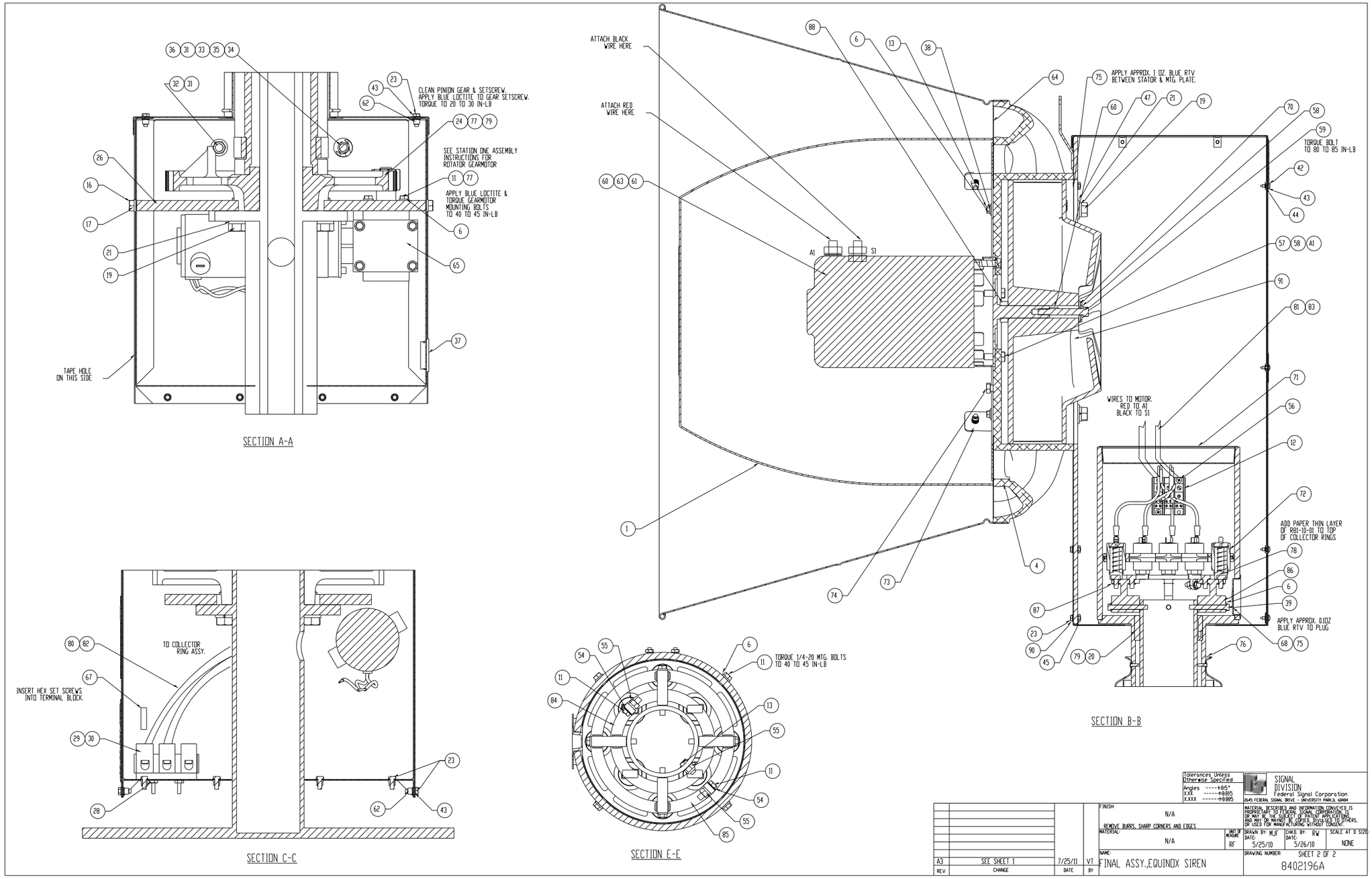
SECTION A-A
SECTION B-B
SECTION C-C
SECTION E-E
CLEAN PINION GEAR & SETSCREW. APPLY BLUE LOCTITE TO GEAR SETSCREW. TORQUE TO 20 TO 30 IN-LB
SEE STATION ONE ASSEMBLY INSTRUCTIONS FOR ROTATOR GEARMOTOR
APPLY BLUE LOCTITE & TORQUE GEARMOTOR MOUNTING BOLTS TO 40 TO 45 IN-LB
TAPE HOLE ON THIS SIDE
ATTACH BLACK WIRE HERE
ATTACH RED WIRE HERE
APPLY APPROX. 1 OZ. BLUE RTV BETWEEN STATOR & MTG. PLATE.
TORQUE BOLT TO 80 TO 85 IN-LB
WIRES TO MOTOR. RED TO A1 BLACK TO S1
ADD PAPER THIN LAYER OF R81-10-01 TO TOP OF COLLECTOR RINGS
APPLY APPROX. 0.1OZ BLUE RTV TO PLUG
TO COLLECTOR RING ASSY.
INSERT HEX SET SCREWS INTO TERMINAL BLOCK.
TORQUE 1/4-20 MTG. BOLTS TO 40 TO 45 IN-LB
Tolerances Unless Otherwise Specified
Angles ±.05°
XXX ±.015
XXXX ±.005
SIGNAL DIVISION
Federal Signal Corporation
2645 FEDERAL SIGNAL DRIVE - UNIVERSITY PARK, IL 60484
FINISH: N/A
REMOVE BURRS, SHARP CORNERS AND EDGES
MATERIAL: N/A
UNIT OF MEASURE: RF
DRAWN BY: M.J.F
DATE: 5/25/10
CHK'D BY: RV
DATE: 5/26/10
SCALE: AT 8.5 SIZE
NONE
NAME: FINAL ASSY.,EQUINOX SIREN
DRAWING NUMBER: 8402196A
SHEET 2 OF 2
A3 SEE SHEET 1
REV CHANGE
7/25/11 DATE
VT BY

Figure 4-10. Equinox Final Assembly, Sheet 2